(12) UK Patent Application (19) GB (11) 2 143 731 A

(43) Application published 20 Feb 1985

(21) Application No 8418118

(22) Date of filing 17 Jul 1984

(30) Priority data

(31) 8319841 (32) 22 Jul 1983 (33) GB

(51) INT CL³
A47C 27/04

(52) Domestic classification
A4M 1C1B3 1C5D 1C5F

(56) Documents cited
GB 0515588

(58) Field of search
A4M

(71) Applicant
Multilastic Limited (United Kingdom),
134 High Street, Brierley Hill, West Midlands

(72) Inventor
Maurice Vienney

(74) Agent and/or Address for Service
Barker Brettell & Duncan,
138 Hagley Road, Edgbaston, Birmingham B16 9PW

(54) Spring interiors for mattresses and other articles

(57) In a modification of a known form of spring interior, bands of coil springs (15, Fig. 3) are disposed side by side and connected by helical wires (16, Fig. 3) extending transversely of the bands, each band is made from a single length of wire (1), and each spring in each row is joined to the next by an integral wire link (5) comprising a bridging portion (7) which extends lengthwise of the row and which includes a laterally extending supporting structure (9). The supporting structures resist any tendency for upholstery material to sink between adjacent coils in each band in use. The supporting structures may be of any shape such as loops (9) or zig-zags.

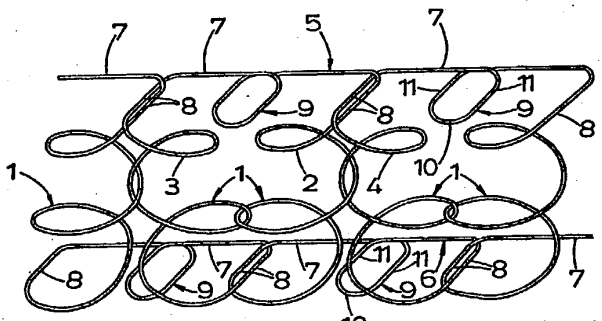

FIG1.

GB 2 143 731 A

SPECIFICATION

Spring interiors for mattresses and other articles

This invention relates to spring interiors for mattresses and other articles such as divans, seats, chairs, settees and the like, the articles including components such as seat squabs and seat backs.

A known form of spring interior comprises a plurality of bands of springs disposed side by side and connected together by helical wires which extend transversely of the bands and embrace portions of the bands. Several kinds of bands of springs have been proposed for incorporation in spring interiors. One kind of band, which has been widely used and which will hereinafter be referred to as a band of springs of the kind specified, comprises a single length of spring wire shaped to form a plurality of individual coil springs arranged in a row, one end turn of each coil spring lying adjacent to a top face of the band and the other end turn of each coil spring lying adjacent to a bottom face of the band, each coil spring being of a hand opposite to the hand of the adjacent coil springs immediately before and after it in the row, and being joined to said adjacent coil springs by wire links integral with the coil springs, one of said links being in the top face of the band and the other of said links being in the bottom face of the band, and each link comprising a bridging portion which extends lengthwise of the row.

When bands of springs of the kind specified are assembled together to form a spring interior they are disposed side by side and interconnected by helical wires, some of which lie in the top face of the spring interior and others of which lie in the bottom face thereof, the top and bottom faces of the spring interior being the faces defined by the top and bottom faces of the bands incorporated in the spring interior. Each helical wire extends across the bands of springs and embraces portions of wires of the bands that extend transversely of the bands from the ends of the bridging portions of the links. In the top face of the spring interior the helical wires are disposed at uniform intervals along the bands of springs, the arrangement being such that there are two springs disposed in the interval between each helical wire and the next. There is a similar arrangement in the bottom face of the spring interior.

Bands of springs of the kind specified that have been described and manufactured hitherto have been such that the bridging portion of each link is rectilinear and lies at or near the place where a side face of the band meets the top or botom face thereof. When bands of springs of that design are incorporated in spring interiors the bridging portion of each link therefore extends from one helical wire to the next in a direction at right angles to the helical wires.

It will be appreciated from the foregoing description that the top face of a spring interior assembled in this way has the general appearance of a rectangular grid. Each of the transverse elements of the grid comprises a helical wire, and each of the longitudinal elements of the grid comprises a row of mutually aligned bridging portions. Within the confines of each rectangle of the grid and disposed a little lower than the grid are the upper end portions of two adjacent coil springs, those two springs constituting parts of the same band of springs. The bottom face of the spring interior is of course similar to the top face, though inverted.

In this description of the invention there are references to faces of bands of springs and of spring interiors. As the bands of springs and spring interiors are of course of open-work or skeletal form, the term face must be understood as referring to an imaginary surface defined by the relevant parts of the bands or spring interiors. Furthermore, as the wires and helical wires are of finite width or thickness and as they sometimes overlap each other the term face cannot be understood as having a strictly geometrical meaning. Nevertheless, as the faces concerned are relatively extensive and are of flat shape their locations can in practice be determined without difficulty or ambiguity.

For convenience of description certain faces are referred to as top faces and others as bottom faces. It is to be understood, however, that such use of the terms top and bottom herein are not intended to introduce any limitation or restriction into the ways in which the parts or products concerned may be orientated during manufacture or assembly or when in use. It may happen, however, that in a number of instances, particularly in relation to spring interiors incorporated in mattresses, and articles such a seat squabs, the top surfaces of the spring interiors will be disposed at the top thereof.

It is customary for a spring interior to be incorporated in an upholstered article. In such an article at least one of the main faces of the spring interior (that is the top and bottom faces thereof) is covered by a layer or layers of padding. This in turn may be covered by a cover made of sheet material such as ticking, upholstery fabric, leather or the like. In use, when pressure is applied to an upholstered face of such an article the filling is pressed towards the spring interior, and in the absence of any additional support tends to enter the rectangular openings in the grid. When the thickness of the filling is relatively small as compared with the dimensions of each rectangular grid opening the upholstery tends to be deformed in such a way that the pattern of the grid forms relatively unyielding ridges in the cover and can be felt by the user. This entry of the filling into the spring interior is a typical example of a phenomenon known in the trade as "cupping".

One method commonly employed to prevent or reduce "cupping" is the provision of a flexible diaphragm or separator between the spring interior and the filling. The diaphragm or separator may comprise a sheet of flexible but inextensible fabric or it may comprise a sheet of mesh. One type of mesh that is widely used comprises a plurality of uniformly spaced parallel cords of twisted paper or plastics strip traversed at right angles by a plurality of uniformly spaced parallel resilient wires, the

wires piercing all the cords except the two marginal cords, and end portions of the wires being shaped to form tight loops or eyes embracing the marginal cords. The rectangular apertures in such a mesh are considerably smaller than those in the grids of the top and bottom faces of the spring interior so that any tendency to "cupping" is much reduced.

An object of the present invention is to provide an improved construction of band of springs which, when incorporated in a spring interior, reduces the problem outlined above.

From one aspect the present invention consists in a band of springs of the kind specified in which the bridging portions of links in the top face of the band, or in the bottom face of the band, or in both the top and bottom faces of the band, are so shaped as to extend not only longitudinally of the band but also laterally thereof, so that at locations along the band between the ends of those bridging portions intermediate parts of the bridging portions afford supporting structures such as may be used to support upholstery.

In use, if padding or other upholstery material is disposed against a face containing those supporting structures there is a reduction in any tendency there might be for it to enter the band through that face when forces are applied to the material in a direction or directions such as to compress the coil springs incorporated in the band.

From another aspect the present invention consists in a spring interior comprising a plurality of bands of springs, at least some of which are in accordance with that aspect of the present invention set out in the last preceding paragraph but one, disposed side by side and interconnected by helical wires lying in the top and bottom faces of the bands and extending across the bands, each helical wire embracing portions of wires of the bands that extend transversely of the bands from the ends of the bridging portions of the links.

From yet another aspect the present invention consists in an upholstered article comprising a spring interior in accordance with that aspect of the present invention set out in the last preceding paragraph, and including upholstery material disposed against at least one of the main faces of the spring interior (the main faces being those containing the top and bottom faces of the constituent bands), in which the bridging portions of the links afford said supporting structures.

In preferred forms of bands of springs all the bridging portions in the top face, or all the bridging portions in the bottom face, or all the bridging portions in both the top and bottom faces of the band are shaped to afford supporting structures.

Each supporting structure may be of any of a wide variety of different shapes. It is of course desirable that the supporting structure should provide adequate support without requiring the use of more spring wire than is necessary and that the support should be afforded in a suitable position or positions. As far as this latter consideration is concerned it is often desirable to provide a supporting structure half way between the ends of the bridging portion of which it forms a part so that in a spring interior it lies half way between adjacent helical wires. Similarly it is often desirable for the supporting structure to be disposed substantially symmetrically with respect to the longitudinal centre line of the top or bottom face of the band of springs of which it forms a part; preferably it extends more than half way across the top or bottom face of the band, and more preferably for at least three quarters of the way across the band. The supporting structure may be in the shape of a semi-circle or other arc or it may comprise a pair of straight portions inclined to each other. Alternatively it may be of sinuous or zig-zag form; for example it may be shaped to resemble the letter W. A preferred form of supporting structure, however, is in the shape of a loop or loops of wire lying in the top or bottom face of the band and extending to one side of the remainder of the bridging portion of which the loop or each loop forms a part. It is generally appropriate to provide just one loop in each bridging structure.

In the manufacture of bands of springs of the kind specified it is the normal practice to take wire from a coil, or other stock, and to form it into successive coil springs, with a link remaining between each spring and the next. The component springs of the band are preferably coupled together by having turns of adjacent coil springs passed round each other. The resultant product can then be wound up to form a roll of spring band. (Coupling and rolling are both referred to in more detail below.) As the hand of each spring formed is opposite to the hand of the spring formed immediately before it there is no cumulative net twisting of the wire in either direction during the formation of the band. In consequence there is no requirement to rotate either the stock or the roll of product bodily. This has in fact constituted one of the reasons why the large-scale manufacture of bands of springs of the kind specified has proved to be commercially practicable.

In a preferred method of manufacturing bands of springs in accordance with the present invention use is made of a method similar to that known method outlined above, the support means comprising loops formed by shaping means that is also used to form the coil springs. In order to avoid there being any cumulative net twisting of the wire during the formation of the band the number of loops of one hand in any extensive length of the band is preferably balanced by the number of loops of the other hand in that length of band. In a preferred method, in fact, each loop of one hand succeeds a loop of the other hand, though a coil spring or coil springs may be formed between such successive loops. In a particularly preferred method the bridging portion of every link is formed with a single loop, and each loop of one hand is succeeded by a loop of the other hand so that all the loops in the top face of the band are of one hand while all the loops in the bottom face of the band are of the other hand.

The present invention will now be described in more detail, by way of example, with reference to

the accompanying drawings, in which:

Figure 1 is an isometric view of a portion of a band of springs embodying the present invention,

Figure 2 is a plan view of a link forming part of a band of springs generally similar to that shown in Figure 1 but incorporating a supporting structure of a modified form, and

Figure 3 is a plan view of part of a spring interior incorporating bands of springs each of the kind shown in Figure 1, the Figure including only those parts of the spring interior in or near the top face thereof.

The band of springs, a portion of which is illustrated in Figure 1, is made from a single length of spring wire shaped to form a plurality of individual coil springs 1 arranged in a row. Each coil spring 1 comprises about two and a half turns of wire. The axis of each coil spring is not upright but is inclined lengthwise of the band, each spring being inclined in a direction opposite to that in which its two immediate neighbours in the row are inclined. The end turns of the coil springs 1 lie adjacent to the top and bottom faces of the band. Each coil spring, such as that numbered 2, is so coiled as to have a hand opposite to the hand of the adjacent coil springs, such as 3 and 4, immediately before and after it in the row. Each coil spring 1 is joined to the next adjacent coil springs by wire links integral with the coil springs. One of the two links is in the top face of the band and the other is in the bottom face thereof. For example, coil spring 2 is connected to coil spring 3 by link 5, which is in the top face of the band, and to coil spring 4 by link 6, which is in the bottom face of the band. Each link comprises a bridging portion 7 which extends longitudinally of the row of coil springs. Each link also includes end portions 8 each of which extends in a direction normal to the longitudinal axis of the band. Those end portions 8 of the links also lie in the top and bottom faces of the band.

In the band illustrated the location of the junction between each end of each spring and the associated end portion of the link is well defined, for the springs are curved and the end portions are straight. In other constructions, however, the junction may be less well defined, while in others the end portions of the links may be replaced by arcuate extensions of the coil springs; in those last cases the links must be considered as consisting solely of the bridging portions.

Each bridging portion 7, in addition to extending longitudinally of the band also extends laterally thereof to form a supporting structure in the form of a loop of wire 9 lying in the top or bottom face of the band, as the case may be, and extending to one side of the remainder of the bridging portion of which it forms a part. Each loop 9 lies half way between the end portions 8 of the link of which it forms a part and it extends from one side face of the band to a location a little way short of the other side face thereof, though rather more than three quarters of the way across the band. Each loop 9 includes a semicircular central part 10 which joins parallel, rectilinear limbs 11 parallel with the end portions 8. It will be observed that all of the loops 9 in the top face of the band are of one hand while all the loops in the bottom face of the band are of the other hand.

The band of springs illustrated in Figure 1 can be made by a method similar to that described and illustrated in the complete specification of British patent No. 937 644 of Willi Gerstorfer, and using apparatus similar to that described and illustrated in that specification. The operation of that apparatus can readily be modified to produce a loop-shaped supporting structure of the same hand as the coil spring just formed or of the same hand as the coil spring about to be formed. After the coil springs and links have been formed, each coil spring is coupled with the next by having an intermediate turn thereof passed round an intermediate turn of the next spring. This coupling can be carried out mechanically by a method similar to that described in the aforementioned complete specification. The coil springs 1 illustrated in Figure 1 are coupled in this manner.

The band of springs can be wound up to form a roll in the manner described and illustrated in the aforementioned complete specification. In this connection it will be appreciated that as the support structures 9 do not project out of the planes of the top and bottom faces of the band of spring they do not interfere with the packing of the turns of the roll that occurs as it is wound up.

Figure 2 illustrates a modification that can be incorporated in a band of springs generally similar to that shown in Figure 1. In this modification each link 5 is replaced by a link 12 of the shape illustrated in Figure 2. Each link 12 has a bridging portion 13 which extends longitudinally of the row of coil springs. Each link 12 also includes end portions 14 similar to the end portions 8 of the links 5. In place of the loop 9, however, the bridging portion 13 is formed with a supporting structure 16 of zig-zag form shaped to resemble the letter W. This extends more than half way across the face of the band in which it lies.

A plurality of bands of springs can be assembled to form a spring interior. Figure 3 shows part of such a spring interior. Bands of springs, 15, each similar to that shown in Figure 1, are disposed side by side and preformed helical wires 16 are attached to them. The helical wires 16 lie in the top and bottom faces of the bands and extend at right angles to the longitudinal axes of the bands. Each helical wire 16 embraces one pair of closely adjacent end portions 8 of each band. The assembly may be effected by a method similar to that described and illustrated in the complete specification of British patent No. 1 095 980 of Multilastic Limited.

It will be seen from Figure 3 that much of the top face of the spring interior has the general appearance of a rectanuglar grid. Each of the transverse elements of the grid comprises a helical wire 16, with the end portions 8 embraced by it, and each of the longitudinal elements of the grid comprises a row of mutually aligned bridging portions 5. Within the confines of each rectangle of the grid and disposed a little lower than the grid are the

upper end portions of two adjacent coil springs 1. Were it not for the presence of the supporting structures 9, the top face of the spring interior would present relatively large rectangular apertures into which upholstery material such as filling or padding placed on top of the top face could readily enter, thereby giving rise to "cupping". The presence of the supporting structures 9, however, reduces any tendency to "cupping", as the supporting structures occupy central parts of the rectangular apertures and can serve to support the upholstery material.

The spring interior can be incorporated in an article such as an upholstered mattress or a seat squab. One or more layers of filling or padding are placed against the top and/or bottom face of the spring interior and covered with a suitable cover material. In use, when forces are applied to the article in such a direction as to compress the springs the support structures tend to resist "cupping" of the filling or padding.

It may be possible to dispense with the use of a diaphragm between the filling and the spring interior or it may at least be possible to use a diaphragm less substantial than that which would have been necessary if the supporting structures had been omitted.

CLAIMS

1. A band of springs of the kind specified in which the bridging portions of links in the top face of the band, or in the bottom face of the band, or in both the top and bottom faces of the band, are so shaped as to extend not only longitudinally of the band but also laterally thereof, so that at locations along the band between the ends of those bridging portions intermediate parts of the bridging portions afford supporting structures such as may be used to support upholstery.

2. A band of springs according to claim 1 in which all the bridging portions in one face or all the bridging portions in both faces of the band are shaped to afford supporting structures.

3. A band of springs according to either of claims 1 and 2 in which each supporting structure lies half way between the ends of the bridging portion of which it forms a part.

4. A band of springs according to any one of the preceding claims in which each supporting structure extends more than half way across the top or bottom face of the band.

5. A band of springs according to any one of the preceding claims in which each supporting structure is of sinuous or zig-zag form.

6. A band of springs according to any one of claims 1 to 4 in which each supporting structure is in the shape of a loop or loops of wire lying in the top or bottom face of the band and extending to one side of the remainder of the bridging portion of which the loop or each loop forms a part.

7. A band of springs according to claim 6 in which the bridging portion of every link is formed with a single loop, and each loop of one hand is succeeded by a loop of the other hand so that all the loops in the top face of the band are of one hand while all the loops in the bottom face of the band are of the other hand.

8. A band of springs of the kind specified and substantially as herein described with reference to Figures 1 and 3 of the accompanying drawings.

9. A band of springs of the kind specified and substantially as herein described with reference to Figure 2 of the accompanying drawings.

10. A spring interior comprising a plurality of bands of springs, at least some of which are in accordance with anyone of the preceding claims, the bands being disposed side by side and interconnected by helical wires lying in the top and bottom faces of the bands and extending across the bands, each helical wire embracing portions of wires of the bands that extend transversely of the bands from the ends of the bridging portions of the links.

11. A spring interior according to claim 10 and substantially as herein described with reference to Figure 3 of the accompanying drawings.

12. An upholstered article comprising a spring interior according to either of claims 10 or 11 and including upholstery material disposed against at least one of the main faces of the spring interior (the main faces being those containing the top and bottom faces of the constituent bands), in which the bridging portions of the links afford said supporting structures.

Printed in the UK for HMSO, D8818935, 12/84, 7102.
Published by The Patent Office, 25 Southampton Buildings, London, WC2A 1AY, from which copies may be obtained.

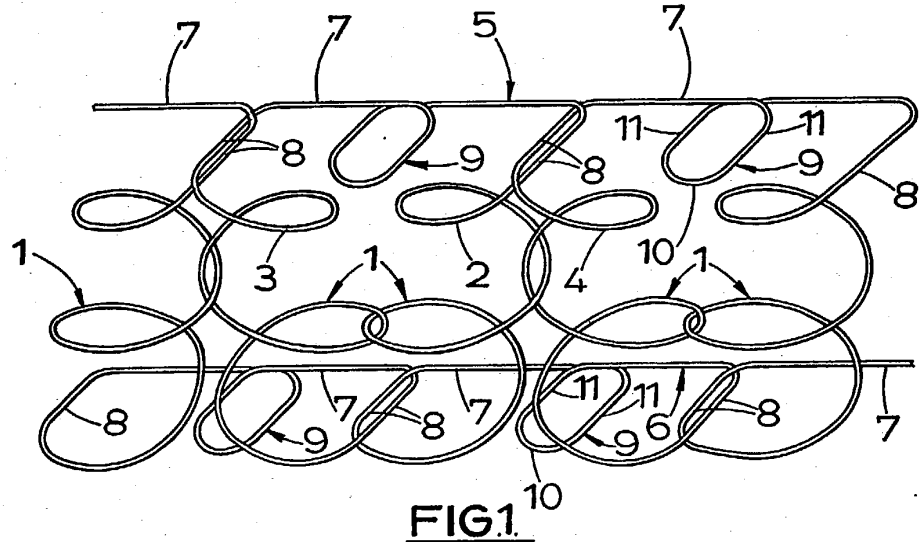

FIG.1.

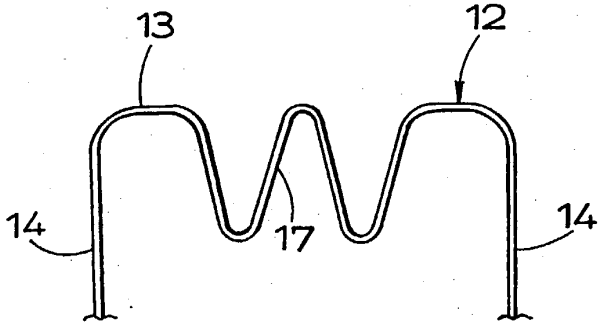

FIG.2.

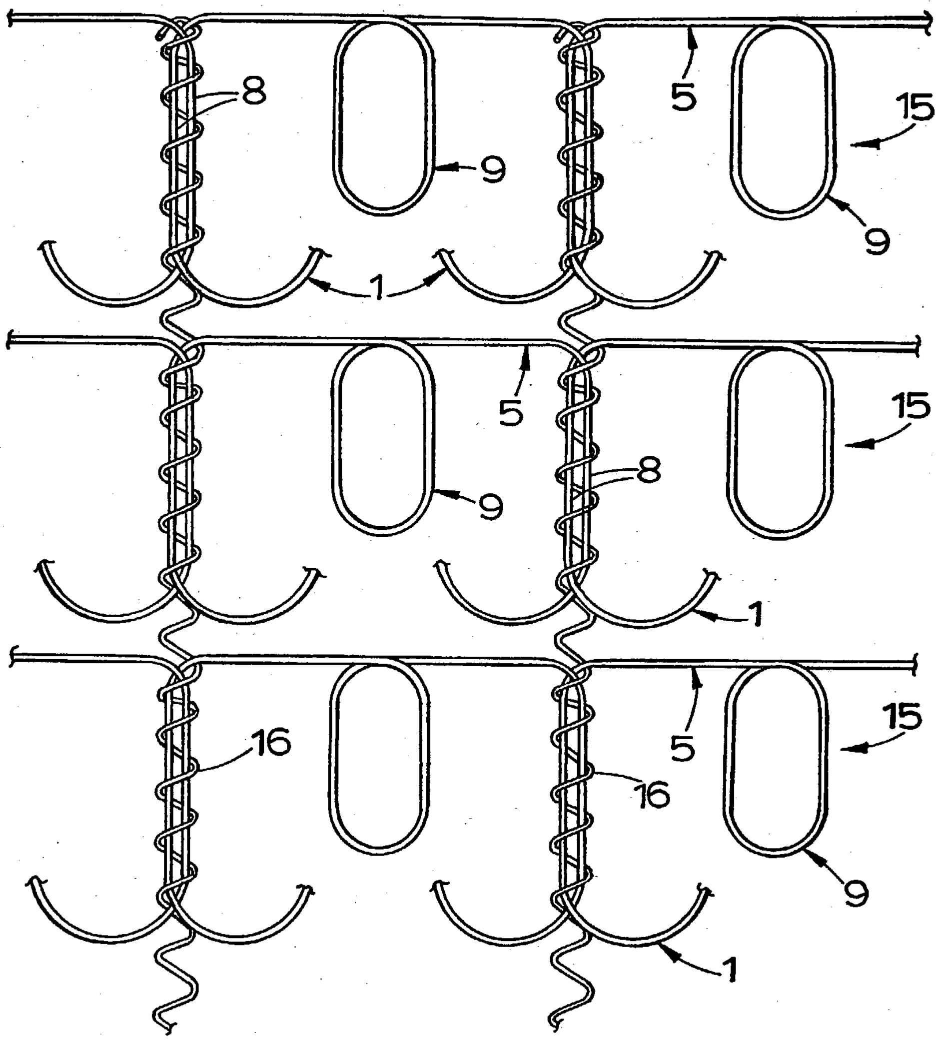

FIG.3.